

National Aeronautics and Space Administration





**FAA/NASA/Industry  
Airport Planning**

September 12–13, 2006

*TECHNOLOGY—  
Smart Solutions  
for Airport  
Capacity*

workshop





www.nasa.gov

# "Baggage Processing and Screening - RFID and other Technologies"



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# The Problem...Published Monthly !

<b>Airlines</b> Aug 2005	<b>Total Misshandled Baggage</b>	<b>Enplaned Passengers</b>	<b>Reports per 1000 passengers</b>
Southwest Airlines	36,663	8,291,425	4.42
Delta Air lines	58,741	7,310,674	8.03
American Airlines	45,978	7,071,943	6.50
United Airlines	21,000	5,252,634	4.00
Northwest Airlines	22,896	4,268,139	5.36
US Airways	22,660	3,164,521	7.16
Continental Airlines	14,197	3,072,188	4.62
America West Airlines	8,604	1,975,357	4.36
Airtran airways	5,516	1,547,438	3.56
Skywest Airlines	14,674	1,539,221	9.53
American Eagle Airlines	16,666	1,539,095	10.83
Alaska Airlines	10,742	1,529,356	7.02
JetBlue airways	8,096	1,368,165	5.92
Expressjet Airlines	8,713	1,344,146	6.48
Comaire	13,781	1,218,746	11.31
Atlantic Southeast Airlines	20,735	1,039,292	19.95
Frontier Airlines	3,938	787,147	5.00
Hawaiian airlines	1,726	537,881	3.21
Independnce Air	2,150	519,009	4.14

**Overall:**

**Range is 6-8 bags mishandled per 1,000...**

**not including International...**

**and only as reported!!**



# Bad PR, Bad Results, Bad Future



**USA TODAY**

## Airlines lost 10,000 bags a day in '05

By Marilyn Adams, USA TODAY

U.S. airlines last year lost about 10,000 bags a day on average, the worst performance since 1990.

The rate of lost suitcase reports per 1,000 passengers on flights soared 23% from a year earlier, according to recent numbers from the U.S. Department of Transportation. Among the reasons: a surge in the number of passengers, airline budget cuts, backed-up flights and tighter inspections of luggage.....



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## Grumbling grows among airline passengers

Government report shows nearly 10,000 lost bags a day, increase in arrival delays.

By Chris Isidore, CNNMoney.com senior writer

February 17, 2006: 9:46 AM EST.....



# A Business Where No One Wins...

Southwest Airlines' rate of lost bags jumped nearly 27%. Southwest blames the airline's cranky new bag systems in Baltimore, Las Vegas and Phoenix

## NEXT TIME, ONLY TAKE CARRY ON...

Airlines with the most lost baggage reports per passenger in 2005

RANK	AIRLINE	REPORTS PER 1000 PASSENGERS
1	Atlantic Southeast	17.41
2	Comair	10.75
3	American Eagle	10.25
4	Skywest Airlines	10.06
5	US Airways	9.62

SOURCE: U.S. DEPT OF TRANSPORTATION

[www.shipcomwireless.com](http://www.shipcomwireless.com)

## YOU CAN CLAIM YOUR BAGS...

Airlines with the fewest lost baggage reports per passenger in 2005

RANK	AIRLINE	REPORTS PER 1000 PASSENGERS
1	Hawaiian Airlines	2.95
2	Airtran Airways	3.45
3	Independence Air	3.54
4	jetBlue Airways	4.06
5	ATA Airlines	4.07

SOURCE: U.S. DEPT OF TRANSPORTATION

...least of all,  
the passenger!



# ...and the DOT Statistics are Low!

## Airline baggage woes worst in 8 years

*The Associated Press*

Tucson, Arizona | Published: 02.18.2006

**WASHINGTON — More bags were lost, damaged, delayed or pilfered by U.S. airlines last year than in at least eight years, according to the Bureau of Transportation Statistics.**

**Reports of mishandled bags on domestic flights rose 23 percent in 2005, from 4.91 per 1,000 passengers in 2004 to 6.04 per 1,000. That's an average of about 9,700 lost or damaged bags per day.....**



# Addressing an Industry Challenge...

## *The Dilemma*

- Lost/Mishandled bags cost millions every year
- Passengers upset, even angry
- Government statistics show baggage problem worse after 15 years
- Bar codes not accurate, reliable, flexible enough
- RFID is great, but tags too expensive, requires CapEx and prospects of recurring tag costs
- Passengers highly price-sensitive. Resistance to ticket increases.
- Manual entry and lack of easy access to bag and cargo data during journey



# Glen Beck...

## *Who is saying what?*



- *“Airlines are not ready for RFID since it is not accurate enough...”*
- *“Security is the TSA’s problem...”*
- *“Passengers speak with their wallets and get what they ask for...”*
- *“Airports are landlords and defer to the airlines...”*
- *“CUTE/CUSS is not in the airlines best interests...”*
- *“The Federal Government is the real problem!”*



# Addressing an Industry Challenge...

## *The Solution*

- **Complement Bar Code with RFID for baggage, cargo, vehicles and more**
- **Improve data capture accuracy and integrity**
- **Interface to local and central data repository for BHS/BRS/AODB**
- **Ensure integration to business/workflow processes**
- **Web/Internet access with easy to use, intuitive GUI**
- **Use an enterprise IT Dashboard to gain visibility and make operational decisions**



# Short list: Real Solution Benefits...

## Airline and Airport

- Reduce cost of Mishandled bags, especially transfers
- Reduce cost of Customer Service...avoid bad customer experience
- Improve Gate Management: turn planes faster
- Reduce labor involvement in baggage/cargo handling
- Improve visibility to operations...initiate actions rather than reactionary
- Avoid flight delays to retrieve baggage
- Ensure security and compliance
- Enable RFID as it is adopted and proven for specific operations
- Audit trail for chargeback's, proof of delivery, more...
- Operational flexibility during peak travel periods
- More...how about improved customer service? Value of your brand?  
New marketing opportunities...new services?



# Transforming Operations...

*Baggage Operations directly affects brand and revenue*



Tagging Point  
Check-in Counter



Read Point 1  
EDS Screening



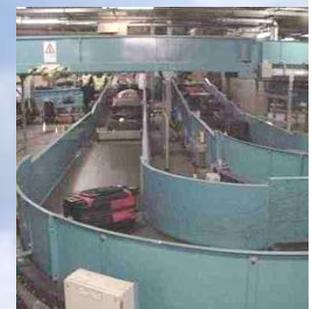
Read Point 2  
Sorting Belts



Read Point 3  
Container Build/  
Storage Rooms



Read Point 4  
Plane Loading/  
Belt Loaders



Read Point 5  
Entering Luggage  
Carousel

**Managing the Journey: From Bag Acceptance...to screening...sorting...the piers...on/off planes...to the destination carousel with visibility.**



# The Traditional Approach...

- Appoint team: collect data, develop objectives, study technologies/vendors, determine requirements, make recommendations.
- Write, issue and manage RFI/RFP procedures as part of the typical procurement process.
- Forecast Program costs, secure funding and manage the budget (CapEx and OpEx provisions) effect on profitability of an airline.
- Award the contract and with the Program Manager, coordinate/manage implementation through providers.
- Adjust current and future system improvements based on budget flexibility.
- Unknowns: managing risks for something not done before.



# ***Proven, complimentary technology, not bleeding edge***

- Bar codes alone don't do the job...average airports/airlines get 80-85% read rate accuracy on conveyor systems
- Transfer baggage...read accuracy drops to 50-80%
- Lost and Mishandled bag direct costs continue to climb: labor/transport/IT support/WorldTracer
- Cost of an unhappy passenger...negative impact on brand image and future growth
- Baggage service support costs at each airport
- Delayed flights: incoming and outgoing

***Passive UHF easily compliments existing bar code systems***



# Providing *Visibility* into Airline Operations

- What if a Dashboard was available to see baggage operations in real time:
  - } See individual bags by ID
  - } Bags by Flight
  - } Bags by Airport/concourse/pier/bag room
  - } All bags for the Airline
  - } Analytics/Performance
  - } Anticipate problems to initiate actions



# **A Vision...Extending Visibility, Across the Airline Enterprise...Globally**

- **Passenger screening and carry-on**
- **Passenger checked baggage inspection, sortation and reconciliation**
- **Remote baggage handling and secure movement**
- **Interline travel: Transfers with audit trails**
- **Individual identification and express passage**
- **Cargo track & trace: safe/trusted shipper**
- **Container security/tracking**
- **Vehicle tracking and access control, airside and landside**
- **Passenger frequent flyer marketing tie-ins**
- **Integration to BHS/BRS/SITA**



# At The Ticket Counter...

## Printers from IER, Vidtronix, Zebra



# New Behavior: Mobility

## Bar Code-RFID-MobilePC-Wireless-Phone

**Antenna (front-mounted)**

and additional electronics  
add the ability to read  
and write EPC Class 1  
RFID tags



Integrated **wireless networking**

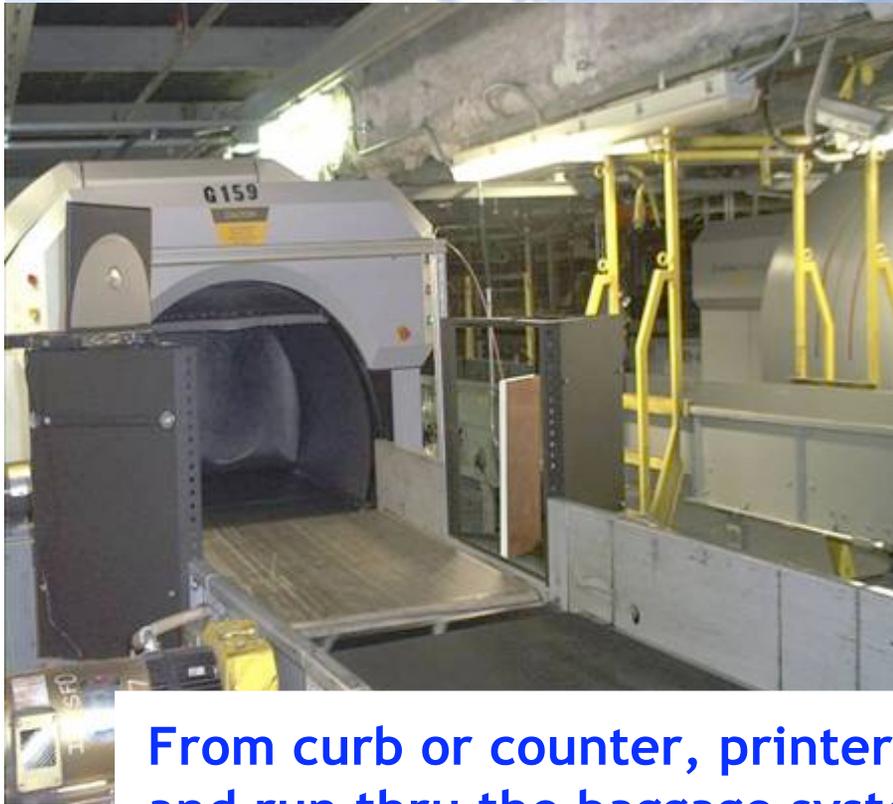


- ➔ 1D bar codes
- ➔ 2D bar code & RFID  
simultaneously  
“all in one”



# Las Vegas: McCarran International Airport

A commitment to security, customer service and cost reduction.



From curb or counter, printers with tags, encoding, attach and run thru the baggage system, with time/date stamps at each critical point in the journey to the ULD and the plane.



# TSA Certified EDS...Explosive, Detection, Screening at Las Vegas to ensure safe flights



# What arrives in Vegas, is tracked and imaged...



# What arrives in Vegas, gets 100% screened...



# What arrives in Vegas, leaves from Vegas...safely



# Hong Kong, PRC

**2005: 20 Million Tags/Yr Across All Airlines at HKIA**



**2004 and Growing...**

- **70 Airlines**
- **38 Million Passengers**
- **17 Million bags departure**

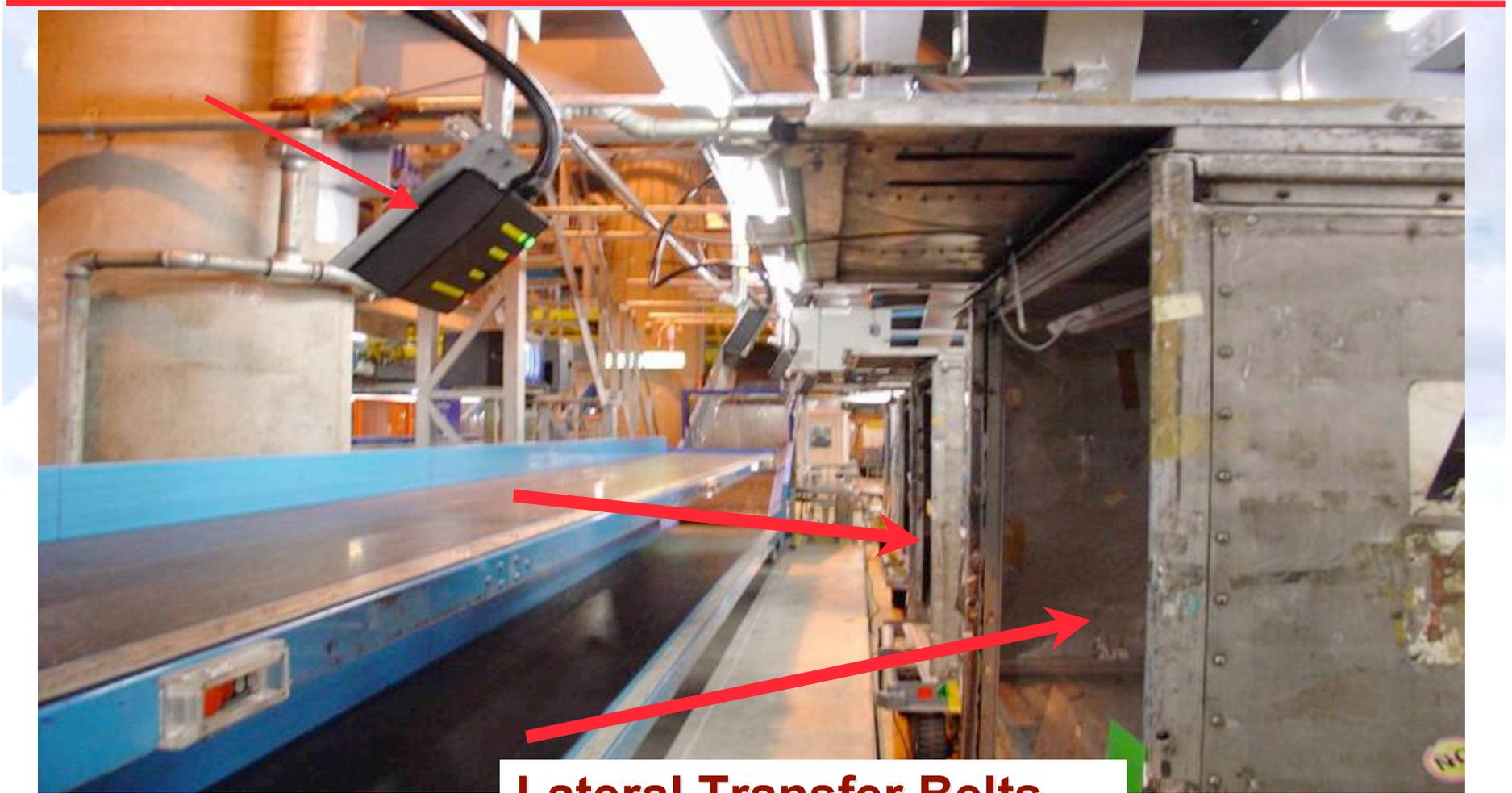
# Showcase for the Orient and the World...

## All Airlines, All Flights, UHF RFID Tags



**Hong Kong: all airlines, all baggage, over 100 conveyor lines, 200+ RFID reader arrays, integration to BHS/SITA, major transfer hub for Asia; future is air cargo.**

# ARS: Transfer Baggage Visibility...from Belt to Right ULD to Right Plane at Right Time



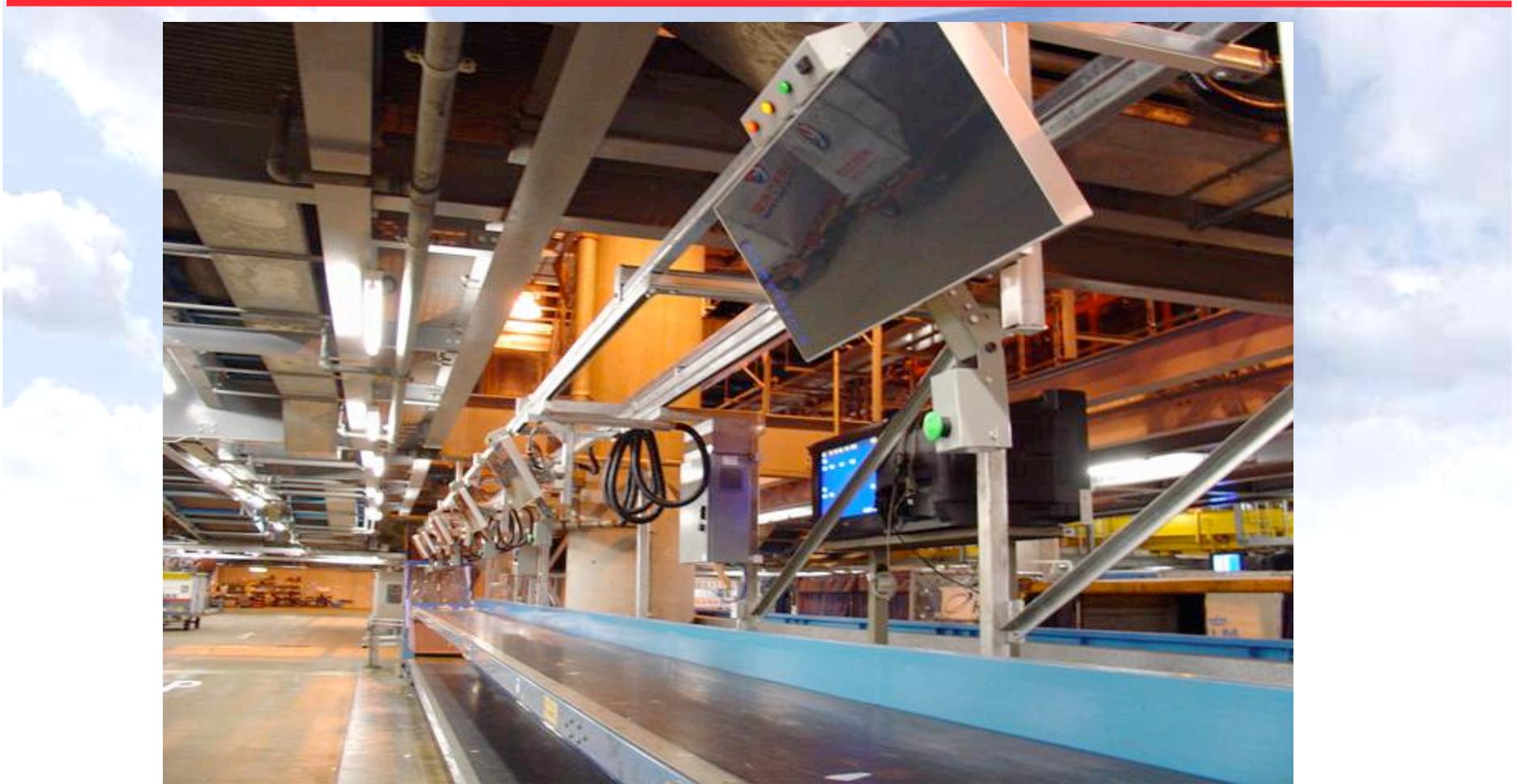
**Lateral Transfer Belts,  
over / under conveyors**



# Optimizing the System is Critical... Environmental, Human, RF Factors



# ARS System: Aviation Reader Station for Double Lateral Transfer Belts



# Result...Bags flowing to dramatically reduce lost/mishandled bags for all transfers.



*HKIA interfaced to SICK Controllers for  
RFID tag reads*

[www.shipcomwireless.com](http://www.shipcomwireless.com)



# HKIA Passive UHF RFID Stick-on Tag





National Aeronautics  
and Space Administration

**At End of the Day...**

**HKIA, McCarran and Aviation will not be an island**



# Take Away Messages...

- The Problem is real and not going away.
- Technology is proven and functional.
- All kinds of business models are available.
- The problem is the “will” to do something and the leadership to take action.



***Who is best positioned to lead action? Airports.***

